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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/526,713

09/23/2005

Timothy Roderick Dalkeith Scott

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04/16/2008

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EXAMINER

MATTER, KRISTEN CLARETTE

ART UNIT

PAPER NUMBER

3771

NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/526,713	Applicant(s) SCOTT ET AL.	
	Examiner KRISTEN C. MATTER	Art Unit 3771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-19, 21-23 and 25-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37 is/are allowed.
- 6) ☒ Claim(s) 2-14, 17-19, 21-23 and 25-36, 38, and 39 is/are rejected.
- 7) ☒ Claim(s) 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Action is in response to the amendment filed on 1/23/2008. Claims 2-15, 17, 19, 21-23, 25, and 27-39 have been amended, claims 1, 20, and 24 have been cancelled, and no claims have been added. Currently, claims 2-19, 21-23, and 25-39 are pending in the instant application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2-4, 6-8, 10-12, 21-23, 25, and 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Cencer (US 6,312,398).

Regarding claims 2-4, 10, 11, 25, 27, 28, and 29, Cencer discloses a movement facilitation device and method comprising an actuator capable of causing at least two joints of a limb or digit (i.e., joints on different fingers of the same hand are considered to be multiple joints of the same limb) to move in a pivotable manner, an operating means operating in response to an input signal from a feedback motion sensor, a controller to control operation of the device, a power source, a support structure in the form of a glove for coupling the device to a patient's body (see column 5, line 55-6, line 65 and Figure 1). Cencer also discloses that the controller (i.e., computer) is programmable for controlling operation of the device (column 6, lines 60-65)

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and that independent actuation of the various joints/actuation members is possible (column 13, lines 15-20).

Regarding claims 6-7 and 12, Cencer discloses cables (48) and sheaths (54) being associated with the support structure, and that the cables can pass over a position on top of the joints (see Figures 3 and 11).

Regarding claim 8, Cencer discloses a motor (18) for facilitating movement of the joints.

Regarding claims 21-23, Cencer discloses that the devices can be used in a variety of configurations involving multiple actuators (i.e., can be considered multiple or singular movement facilitation devices) controlled independently by the controller for producing flexion and extension as well as omni-directional movement of one or more joints (column 6, lines 40-55).

Claims 38 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Dietz et al. (US 6,554,472). Dietz et al. disclose a sensing device for sensing a position of a joint of a patient comprising a sensor capable of providing a signal relating to the position of the joint (x-ray image shows location of various bones with respect to one another, for example), a transducer comprising a radiation source (12), one or more detectors (16) capable of generating a feedback signal dependent on the intensity of the radiation incident on said detector (i.e., the signal generated by the detectors would provide information to the controller and/or user which is used for feedback), wherein at least one detector is free to move with respect to the radiation source (see column 3, lines 50-67), a return mechanism (arms 18 and 20), and a support structure (56) coupled to the patient's body.

As to claim 39, the preamble of the claim is given no patentable weight, and there is no indication in the claim that the device has to do with force or a transducer because these terms only appear in the preamble.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-5, 8, 9, 17, 19, 21, 22, 23, 26-32, and 34-36 are rejected under 35 U.S.C. 103(3) as being unpatentable over Mavroidis et al. (US 6,379,393, herein referred to as “Mavroidis”).

Regarding claims 2-3, 8-9, 27, and 28, Mavroidis discloses a movement facilitation device for facilitating independent movement of joints in a pivotable manner (abstract, lines 6-9) comprising a smart material actuator (column 3, line 10), an operating means for operating the actuator in response to an input signal generated by a sensor and a controller (column 5, line 55-column 6, line 23, and column 3, lines 20-45), said sensor being capable of providing a feedback signal relating to a force on or exerted by the moved joint and the joint position to affect operation of the actuator, a support structure (column 6, line 20) for coupling the device to a patient's body, and a power supply (column 8, line 40). In addition, the system is capable of being used for passive motion therapy because the controller can continuously actuate the actuators.

Mavroidis discloses that the actuator bundles/device can be used in both prosthetic and orthotic devices and provides several working examples of both prosthetic devices and orthotic devices possible with the actuator bundle system, the orthotic device examples show only moving one joint of a limb or digit and the prosthetic device examples show moving multiple joints on a single limb or digit. Therefore, to the extent that Mavroidis is silent as to facilitating independent movement of at least two joints of a patient's limb or digit by attaching the movement facilitation device to multiple joints of a limb or digit, examiner contends that it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the movement device embodiment seen in Figure 26, for example, as an orthotic device coupled to an actual patient's hand instead of a prosthetic hand (i.e., by means such as elastic bands or gloves) for providing an active orthosis to be used in physical therapy. The only difference between the Mavroidis device disclosed in Figure 26 and the instant claims is the fact that the device is shown coupled to a prosthetic hand instead of an actual hand so it appears as though the prosthetic device involving movement of several joints of a finger/hand disclosed by Mavroidis would perform equally well if used as an orthotic device on a patient's hand.

Regarding claim 4, the support structure is capable of being coupled proximate the joint being moved (see Figures and column 6, line 20 which discusses the use of "tendons").

Regarding claim 5, Mavroidis discloses cables for coupling the actuators to the support structure (column 10, lines 30-40).

Regarding claim 17, Mavroidis discloses a lock (column 18, lines 40-45).

Regarding claim 21, Mavroidis discloses a plurality of movement facilitation devices that can be independently controlled to work together by the controlling and operating means (column 5, line 60- column 6, line 5).

Regarding claim 22, Mavroidis discloses that first and second movement facilitation devices capable of working in opposition to one another for flexing and extending a joint (column 13, lines 20-40).

Regarding claim 23, a single movement facilitation device is capable of flexing and extending a joint depending on the arrangement of the bundles and how a single movement facilitation device is defined.

Regarding claim 25, Mavroidis discloses a computer for controlling operation of the device (column 19, line 29).

Regarding claim 26, Mavroidis discloses the device can be used for person's suffering from injury and surgeries (i.e., hand trauma and surgery).

Regarding claims 19 and 29, Mavroidis discloses feedback sensors for controlling the force or position of the joint so that a predetermined maximum is not exceeded (column 13, lines 10-20).

Regarding claims 30-32 and 34-36, the device disclosed by Mavroidis has all of the structural limitations needed to perform the recited method steps and is fully capable of doing so. For example, Mavroidis discloses multiple actuators used in opposition for flexing/extending a joint (column 13, lines 20-40), a locking feature (column 18, lines 40-45), and programming means for controlling a strength or range of movement (column 13, lines 10-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made, upon seeing

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Mavroidis's device, to perform the recited method steps of the instant claims (i.e., programming a continuous passive motion therapy, splinting, or grasping) for providing a desired therapy for a given condition of a patient. Furthermore, splinting, grasping, and continuous passive motion are well known therapies for movement facilitation devices, and it appears as though the device disclosed by Mavroidis would perform equally well with any of the instantly claimed methods.

Claims 26, 30, 31, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cencer.

Regarding claim 26, Cencer is silent as to using the device for injuries. However, the device disclosed by Cencer is fully capable of being used on a patient following an injury-type event. It would have been obvious to one of ordinary skill in the art at the time the invention was made, upon seeing Cencer's device, to use it for facilitating movement of a joint following one of the claimed events because it is well known in the art that joint movement facilitation is often necessary following such events.

Regarding claims 30, 34, and 35, the device disclosed by Cencer has all of the structural limitations needed to perform the recited method steps and is fully capable of doing so. For example, Cencer discloses a variety of combinations of movement devices that can be used and operated by a programmable computer and that the joints can be actuated independently of each other. It would have been obvious to one of ordinary skill in the art at the time the invention was made, upon seeing Cencer's device, to perform the recited method steps of the instant claims (i.e., programming a continuous passive motion therapy, splinting, or grasping) for providing a desired therapy for a given condition of a patient. Furthermore, splinting, grasping, and

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continuous passive motion are well known therapies for movement facilitation devices, and it appears as though the device disclosed by Cencer would perform equally well with any of the instantly claimed methods.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cencer in view of Mavroidis. To the extent that Cencer is silent as to the devices being arranged to either flex or extend the joints in opposition to one another, Mavroidis is cited to show that similar actuators can be used in movement facilitation devices to act in the same manner as muscles, and various devices are capable of flexing or extending various movement facilitation devices independently to either flex or extend a joint. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have provided the actuator bundle system of Mavroidis on the support system of Cencer to allow the actuators to independently control either flexion or extension of the joints (in opposition) in order to mimic natural movement of the hand caused by muscle actuation. It also would have been obvious to one of ordinary skill in the art at the time the invention was made, upon seeing the modified Cencer device, to perform the recited method steps of the instant claims (i.e., splinting) for providing a desired therapy for a given condition of a patient. Furthermore, splinting is well known for movement facilitation devices, and it appears as though the modified Cencer/Mavroidis device would perform equally well if operated by the instantly claimed method steps.

Claims 13, 18, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mavroidis as applied to claims 2-5, 8, 9, 17, 19, 21, 22, 23, 26-32, and 34-36 above, and further

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in view of Girard (US 4,167,044). Mavroidis is silent as to the specifics of the locking mechanism. Girard discloses a mechanical locking means comprising a ratchet (54) for locking a movement facilitation device at a given angle. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Mavroidis's device with a mechanical locking means such as a ratchet for locking the device at a given angle or to allow incremental control of the device.

Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mavroidis as applied to claims 2-5, 8, 9, 17, 19, 21, 22, 23, 26-32, and 34-36 above, and further in view of Kinnunen et al. (US 6,619,134). Although Mavroidis discloses sensors for measuring force and position feedback information, Mavroidis is silent as to a force-position sensor. Kinnunen et al. disclose a force position sensor comprising a light source (4), a detector means, and a return mechanism (2) for measuring forces and displacements (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a force-position sensor similar to that disclosed by Kinnunen et al. in the device disclosed by Mavroidis for measuring the forces and positions of the joints.

Response to Arguments

Applicant's arguments filed 1/23/2008 have been fully considered but they are not persuasive.

In response to applicant's arguments that all joints of a single digit of Cencer must operate in the same manner simultaneously, examiner agrees but notes that the claims recite that

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at least two joints of a **limb or digit** must be moved independently. Cencer discloses at least two joints on the same hand being moved and that the joints can be moved independently from each other (column 13, lines 15-20), which would read on the limitation of at least two joints of the same limb being independently moved.

Applicant's arguments with respect to the Mavroidis reference and the independent movement of multiple joints on a limb or digit have been considered but are moot in view of the new ground(s) of rejection.

In response to applicant's arguments that the Mavroidis reference does not disclose determining a measurement from the feedback signal and calculating a parameter, examiner respectfully disagrees. The information contained in the electric signal of Mavroidis represents a measurement of the force or pressure on the joint, and based upon the signal provided to the controller the actual force or pressure is calculated and used in the feedback control.

Applicant's arguments with respect to the Kinnunen et al. reference have been considered but are moot in view of the new ground(s) of rejection.

In response to applicant's arguments with respect to claim 18, the ratchet of Girard is considered the adjustable mechanical stopper that would set a safety limit for the position of the joint.

Allowable Subject Matter

Claim 37 is allowed over the prior art of record.

Claims 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose the combination of the specific movement device elements (actuator, operating means, support structure, and controlling means) operating with a sensor for providing a feedback signal comprising a radiation source and one or more detectors wherein at least one detector is free to move relative to the radiation source.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kristen C. Matter whose telephone number is (571) 272-5270.

The examiner can normally be reached on Monday - Friday 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached on (571) 272-4835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kristen C. Matter/
Examiner, Art Unit 3771

/Justine R Yu/

Supervisory Patent Examiner, Art Unit 3771